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EXAMINER
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BAND, MICHAEL A

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UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE PATENT TRIAL AND APPEAL BOARD

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*Ex parte* TADAHIRO OHMI, TETSUYA GOTO, and  
TAKAAKI MATSUOKA

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Appeal 2016-001652  
Application 12/531,515  
Technology Center 1700

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Before TERRY J. OWENS, DONNA M. PRAISS, and  
MICHAEL G. McMANUS, *Administrative Patent Judges*.

OWENS, *Administrative Patent Judge*.

DECISION ON APPEAL

STATEMENT OF THE CASE

The Appellants appeal under 35 U.S.C. § 134(a) from the Examiner's rejection of claims 2, 10–12, 17, 19, and 20.<sup>1</sup> We have jurisdiction under 35 U.S.C. § 6(b).

*The Invention*

The Appellants claim a magnetron sputtering apparatus. Claim 2 is illustrative:

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<sup>1</sup> Multiply-dependent claims 10 and 11 properly depend from claim 2 but improperly depend from claims 1, 4 and 7 which have been withdrawn from consideration by the Examiner (Final Act. 1).

2. A magnetron sputtering apparatus comprising a backing plate to which a target is held facing a substrate to be processed, and a magnet disposed on a back side of said target relative to said substrate, and adapted to confine plasma on a target surface by forming a magnetic field on the target surface using said magnet, wherein:

said magnet comprises a rotary magnet group having a plurality of plate magnets arranged on outer periphery of a columnar rotary shaft facing said plate magnets' surface to a radial direction of the columnar rotary shaft such that the plate magnets are bonded to a surface of the columnar rotary shaft so as to form a plurality of helices and a fixed outer circumferential frame magnet which is arranged in parallel with the target surface around said rotary magnet group and which is magnetized in a direction perpendicular to the target surface;

a magnetic field pattern on the target surface moves with time by rotating said rotary magnet group along with said columnar rotary shaft;

said magnetron sputtering apparatus comprises a shielding member disposed on an opposite side of said target with respect to said rotary magnet group so as to cover an end portion of said target and to be spaced apart from said target, said shielding member being electrically grounded, and said shielding member extends in a direction the same as an axial direction of said columnar rotary shaft and forms a slit opening said target to said substrate; and

said substrate is placed on a substrate placing stage and, while plasma is excited on the target surface by applying a DC power, a RF power, or a DC power and a RF power simultaneously to said target, said substrate is placed under the slit, and a distance between an upper surface of said substrate or said substrate placing stage and a lower surface of said shielding member is shorter than a mean free path of electrons in said plasma at a position of said shielding member and,

said substrate moves in parallel with the target surface and is placed at a retreated position of said substrate which is other than under the slit upon plasma ignition or extinction, and

a distance in a vertical direction between the upper surface of said substrate or said substrate placing stage and the lower surface of said shielding member is shorter than a mean free path of electrons at a position of said shielding member, and a distance in a parallel direction between an end portion of said substrate at a side of the slit and an end portion of said shielding member at a side of the slit is longer than the mean free path of electrons at the position of said shielding member.

*The Rejection*

Claims 2, 10–12, 17, 19, and 20 stand rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which the Appellants regard as the invention.<sup>2</sup>

OPINION

We reverse the rejection. We need address only the sole independent claim, i.e., claim 2. That claim requires a magnetron sputtering apparatus wherein: 1) while plasma is excited on a target (1)'s surface, a substrate (10) on a substrate placing stage (19) is movable to a position under a slit (18) such that a distance (W, 1301) between an upper surface of the substrate (10) or the substrate placing stage (19) and a lower surface of a shielding member (16) is shorter than a mean free path of electrons in the plasma at a position of the shielding member (16), and 2) upon plasma ignition or extinction, a) the substrate (10) is movable in parallel with the target (1)'s surface to a retreated position other than under the slit (18) such that a distance (W, 1301) in a vertical direction between the upper surface of

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<sup>2</sup> Rejections of claims 2, 10–12, 17, 19, and 20 under 35 U.S.C. § 112, first paragraph, written description requirement and 35 U.S.C. § 103 are withdrawn in the Examiner's Answer (Ans. 3).

the substrate (10) or the substrate placing stage (19) and the lower surface of the shielding member (16) is shorter than a mean free path of electrons at a position of the shielding member (16), and b) a distance (1302) in a parallel direction between an end portion of the substrate (10) at a side of the slit (18) and an end portion of the shielding member (16) at a side of the slit (18) is longer than the mean free path of electrons at the position of the shielding member (16) (Spec. ¶¶ 64, 72; Figs. 1, 11).

“[T]he indefiniteness inquiry asks whether the claims ‘circumscribe a particular area with a reasonable degree of precision and particularity.’” *Marley Mouldings Ltd. v. Mikron Indus. Inc.*, 417 F.3d 1356, 1359 (Fed. Cir. 2005) (quoting *In re Moore*, 439 F.2d 1232, 1235 (CCPA 1971)).

The Examiner asserts that claim 2 is indefinite because it does not recite a specific length of the electrons’ mean free path (Ans. 4–5).

The claim recites a relationship between distances in the vertical and parallel directions and the mean free path. That relationship is clear from the claim regardless of the particular length of the mean free path.

The Examiner asserts that “a position of the shielding member” is indefinite because it is unclear whether the position is the shielding member’s bottom, top or side surface or a vicinity of the shielding member (Ans. 4–5).

The “mean free path of electrons at a position of the shielding member” is the electron mean free path where the shielding member (16) is positioned in the apparatus (Figs. 1, 11), not at a particular shielding member (16) surface or a vicinity other than the shielding member (16)’s position.

Thus, the Examiner has not shown that the Appellants' claim 2 fails to circumscribe a particular area with a reasonable degree of precision and particularity. Accordingly, we reverse the rejection.

DECISION/ORDER

The rejection of claims 2, 10–12, 17, 19, and 20 under 35 U.S.C. § 112, second paragraph is reversed.

It is ordered that the Examiner's decision is reversed.

REVERSED